

Remarks

In view of the above amendments and the following remarks, reconsideration and further examination are requested.

New claims 7 and 8 have been added. Support for claims 7 and 8 can be found at least at Figures 1, 3 and 5.

Claim 1 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Kato (US 6,082,439) in view of Haussmann (US 6,161,616).

This rejection is respectfully traversed and submitted to be inapplicable to the claimed invention for the following reasons.

Claim 1 is patentable over the combination of Kato and Haussmann, since claim 1 recites a core structure having, in part, a plurality of seat plates arranged opposite to each other with a predetermined space interposed therebetween and having tubes and corrugated fins arranged alternately therebetween, the seat plates being provided with connection portions having main body portions and wall portions slanted from the main body portions toward the tubes, wherein the tubes have a wall thickness of 0.13 mm to 0.23 mm, and a slant angle between the connection portions and the main body portions of the seat plates satisfies the following relationship: the slant angle $\geq 25 \times (\text{a thickness of the seat plates}) + (-125 \times (\text{the wall thickness of the tubes}) + 25)$. The combination of Kato and Haussmann fails to disclose or suggest these features of claim 1.

Kato discloses a heat exchanger having a core portion 11 constructed by a plurality of tubes 14, plate fins 15 and upper and lower core plates 16. The core plates 16 have a thickness in the range of 0.8 mm – 1.2 mm and the tubes 14 have a thickness of 0.25 mm – 0.50 mm. The upper core plate 16 has a flat portion 16d and a number of step portions 16e extending from the flat portion 16d. The step portions 16e form barring holes 16a in the upper core plate 16 which the tubes 14 pass through to empty into an upper tank 12. An adhesive 24 is located under the step portions 16e to seal the tubes 14 to the upper core plate 16. (See column 4, line 5 – column 5, line 30 and Figures 1 and 2).

As discussed above, the tubes 14 of Kato are disclosed as having a thickness in the range of 0.25 mm – 0.50 mm, which is outside the range of the claimed tubes that are recited as having a wall thickness of 0.13 mm to 0.23 mm. Therefore, it is apparent that the Kato fails to disclose or suggest this feature of the claimed tubes.

Further, the rejection states that Figures 2, 4C and 12C illustrate that the step portions 16e extend from the flat portion 16d at an angle of approximately 30°. However, it is submitted that there is insufficient support for this conclusion. In considering the disclosure of drawings, the United States Court of Appeals for the Federal Circuit has held that “it is well established that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue.” (See Hockerson-Halberstadt, Inc. v. Avia Group Int’l, 222 F.3d 951, 956, 55 USPQ2d 1487, 1491 (2000)). (Also see M.P.E.P. §2125). In the present case, it is noted that the specification fails to indicate that the drawings are to scale or provide relevant dimensions that would support the conclusion that the angle which the step portions 16e extend from the flat portion 16d is approximately 30°. As a result, it is submitted that Kato fails to disclose or suggest the angle of approximately 30°.

In light of Kato’s failure to disclose or suggest the claimed tubes having a thickness in the range of 0.13 mm – 0.23 mm and the angle which the step portions 16e extend from the flat portion 16d being approximately 30°, it is apparent that Kato necessarily fails to disclose or suggest the claimed slant angle between the connection portions and the main body portions of the seat plates satisfying the following relationship: the slant angle $\geq 25 \times (\text{a thickness of the seat plates}) + (-125 \times (\text{the wall thickness of the tubes}) + 25)$.

In light of the above-discussed deficiencies of Kato, it is necessary for Haussmann to disclose or suggest these features in order for the combination of Kato and Haussmann to render claim 1 obvious.

Haussmann discloses an evaporator having a number of flat tubes 2. The flat tubes 2 each have a wall thickness as thin as 0.2 mm (See column 3, lines 50-56; column 4, lines 19-46; and Figures 1-3). However, it is apparent that Haussmann fails to disclose or suggest any configuration whereby seat plates are provided with connection portions having main body portions and wall portions slanted from the main body portions toward the tubes 2.

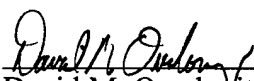
Therefore, although Haussmann discloses flat tubes 2 having a wall thickness of 0.2 mm, it is apparent that its combination with Kato still fails to disclose or suggest the claimed slant angle between the connection portions and the main body portions of the seat plates satisfying the following relationship: the slant angle $\geq 25 \times (\text{a thickness of the seat plates}) + (-125 \times (\text{the wall thickness of the tubes}) + 25)$. As a result, the combination of Kato and Haussmann fails to render claim 1 obvious.

Because of the above-mentioned distinctions, it is believed clear that claims 1-8 are allowable over the references relied upon in the rejection. Furthermore, it is submitted that the distinctions are such that a person having ordinary skill in the art at the time of invention would not have been motivated to make any combination of the references of record in such a manner as to result in, or otherwise render obvious, the present invention as recited in claims 1-8. Therefore, it is submitted that claims 1-8 are clearly allowable over the prior art of record.

In view of the above amendments and remarks, it is submitted that the present application is now in condition for allowance. The Examiner is invited to contact the undersigned by telephone if it is felt that there are issues remaining which must be resolved before allowance of the application.

Respectfully submitted,

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